Before the

FEDERAL COMMUNICATIONS COMMISSION
Washington, DC. 20554

In the Matter of	)	
	)	
Broadcast Localism	)	**MB Docket No. 04-233**
	)	
	)	

To: The Commission

COMMENTS of Nickolaus E. Leggett
N3NL Amateur Radio Operator

The following is a set of comments from Nickolaus E. Leggett, an amateur radio operator (Extra Class licensee – call sign N3NL), inventor (U.S. Patents # 3,280,929 and 3,280,930 and one electronics invention patent application pending), and a certified electronics technician. I also have a Master of Arts degree in Political Science from the Johns Hopkins University (May 1970).

I am one of the original petitioners for Low Power FM (LPFM) broadcasting in RM-9208 (July 1997).

Increasing the Number of Broadcast Stations

Local origination of broadcast programming will be increased, if we increase the number of <u>independent</u> broadcast stations in service. The new low power FM (LPFM) radio broadcasting service is a very useful local outlet. Similarly, the proposed low power AM (LPAM) broadcast service would increase the opportunity for local news, groups, and artists to get on the air.

Despite the liberating influence of LPFM and potentially LPAM, broadcasting is still dominated by very large organizations that are becoming more centralized and concentrated.

This is a strong contrast from print media where the presence of very large newspapers and publishers does not prevent the successful establishment of small newsletters and periodicals. Any U.S. citizen can proceed to write text material and create illustrations, copy the document, and distribute the document to an audience of readers. This freedom is enhanced by the availability of low cost computers, digital cameras, and Internet distribution options.

In contrast the broadcast world is generally limited to large and expensive installations operated by large or very large corporations. Only those with large amounts of capital can currently enter this activity.

The Commission should adopt the goal of making broadcasting as open and accessible as the print media are now. Every citizen of the United States should have the option of setting up his or her own broadcast station to provide local service. <u>This would establish a right to broadcast similar to the right to publish.</u>

Practical Aspects of Establishing a Right to Broadcast

In the conventional broadcasting environment, the right to broadcast is rationed because of the major shortage of broadcasting frequencies. However, technological progress is changing that situation. When we look at the millimeter wave and higher frequency bands, we find that the spectrum is truly huge with enough room for everyone who wants to be a broadcaster.

With the spectrum shortage fading, there is no longer a reason to restrict the creation of broadcast stations. Indeed, over time the de-facto rationing of broadcast licenses will probably be overturned in court because the basic rationale for the rationing will be gone.

In the previous docket for localism, **RM-10803**, I suggested a protocol for the operation of local broadcasting stations in the millimeter waves (November 6, 2003). Please refer to **Appendix A** of this document. This protocol could also be used for even higher frequencies such as infrared light.

Establishing the Right to Broadcast

The time to establish a right to broadcast has come. Every United States citizen should have the right to broadcast as a fundamental component of the right of free speech. This new right does not mean that these new broadcasters would have the right to interfere with existing broadcasters or other licensed users. However, the new broadcasters should be provided with reasonable access to **citizen broadcasting bands** in the millimeter wavelengths and higher frequencies within the electromagnetic spectrum.

We must remember that America is for everyone, not just the most powerful. The Commission must move towards the ultimate in localism where all citizens can broadcast just as all citizens can print and distribute printed materials.

Respectfully submitted,

Nickolaus E. Leggett, N3NL
1432 Northgate Square, Apt. 2A
Reston, VA 20190-3748
(703) 709-0752
nleggett@earthlink.net

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APPENDIX A – A Lighthouse Protocol for Local Broadcasting

Introduction to the Millimeter Waves

The ongoing development of millimeter wave radio technology promises to reduce and perhaps even eliminate radio spectrum shortages. Millimeter waves are in the frequency range of 30 GHz to 300 GHz. It is also known as the Extremely High Frequency (EHF) band (Reference 1).

The millimeter wave band has a huge capacity because it is so much larger than the lower frequency bands that are used by conventional radio services. This provides the opportunity for a large number of users to access broadcasting.

Another interesting facet of the millimeter waves is that there is significant atmospheric absorption of the signals. This is a major problem for many potential users, but it is actually useful for neighborhood broadcasting. This absorption would prevent a neighborhood broadcaster operating in Reston, Virginia from interfering with a nearby neighborhood broadcaster in another town. Each broadcaster would be limited to a naturally enforced coverage area.

Physical Aspects of Millimeter Wave Broadcasting

A millimeter wave installation is typically engaged in point-to-point communication using a narrow beam formed by very high gain antennas. This communication is often referred to as “pencil beam” communication.

Clearly, a fixed pencil beam is the opposite of the broad coverage desired for broadcasting service.

However, a pencil beam can be converted into an omni directional broadcasting system by using a rotating beam. The high-gain transmitting antenna is mounted so that it can be continuously rotated in a similar manner to a plan position indicator (PPI) radar antenna. The transmitting millimeter wave beam would "paint" the surrounding geographic area like an electronic lighthouse.

Lighthouse Protocol for Broadcasting

The neighborhood broadcasting station would transmit packets of digital program material to the broadcast receivers. Each receiver would store the packets and play the program material to the listener.

The station would use a protocol where the same set of packets would be repeated for each beam width around the points of the compass. For example, if the transmitter has a 10-degree beam width, it would transmit 36 repetitions of the packet set. Each repetition would be at a different compass direction to cover a full 360 degrees.

The radio receivers would put the packets together and play them out to the listeners. This would result in the program material being delayed somewhat from real time, but this would not be a major problem for most neighborhood broadcasting applications. The transmission rate of this protocol would depend on the bandwidth of the transmitted signal and the rotation rate of the antenna.

Impacts on Other Millimeter Wave Users

Other users of the millimeter waves are starting to appear. These users are subject to new regulations established by the Commission. The FCC's regulation of these frequencies is based on registration of specific millimeter wave paths:

"Today's action outlines a flexible and innovative regulatory framework for these bands. Because of the "pencil-beam" characteristics of the signals transmitted in the 71-76 GHz, 81-86 GHz and 92-95 GHz bands, systems can be engineered to operate in close proximity to one another without causing interference. In light of this, the FCC has adopted an inventive, non-exclusive licensing approach for these bands. Traditional frequency coordination between users will not be required. Instead, each path will be registered in a database, and entitled to interference protection based on the date of registration." (Reference 2)

The rotating beam used for millimeter wave broadcasting could interfere with existing paths. Regulatory provision will need to be made for millimeter wave broadcasting systems. Perhaps specific fairly small millimeter wave frequency bands will need to be set aside for omni directional radio broadcasting purposes. In assigning such bands, it should be remembered that the range of each broadcasting transmitter would be significantly constrained by atmospheric absorption of the signal.

Millimeter Wave Technology

Millimeter wave radio technology is emerging now. However, it is not the convenient, mature, and off-the-shelf technology used in standard broadcasting.

As a result of this, any millimeter wave broadcasting is going to be an experimental activity for some time. However, it is an appealing technical frontier involving new frequencies and digital technology.

University engineering departments would be interested in developing this type of technology and demonstrating it on their campuses. Amateur radio operators would be interested in devoting their own technical skills to this new technology. Inventors would

like to work with this technology and develop new inventions in this technical area.

Start-up companies would like to move into this action area.

Reference 1: a concise orientation to the millimeter waves is available in the following two columns in QST magazine (The American Radio Relay League, Inc. Newington, CT.) –
Tom Williams (WA1MBA), **Microwavelengths**, QST, July 2003, pp. 79 – 80
Tom Williams, **Microwavelengths**, QST, September 2003, pp. 88 – 89

Reference 2: FCC News Release, October 16, 2003, WT Docket No. 02-146